

## We claim

1. A single step process for the synthesis of nanoparticles of phase pure ceramic oxides of a single or a multi-component system comprising one or more metal ions, said process comprising,
- (e) preparing a solution containing all the required metal ions in stoichiometric ratio by dissolving their respective soluble salts in an organic solvent or in water,
- (f) preparing a precursor by complexing the metal ions with a complexing agent while keeping the ratio of the charges of the acid to the charges of the metal ions as unity;
- (g) adjusting the nitrate/ammonia content in the system;
- (h) heating the system from room temperature to 250-300°C.
2. A process as claimed in claim 1 wherein the desired oxide contains (a) one cation selected from the group comprising of  $\text{Al}_2\text{O}_3$ ,  $\text{ZrO}_2$ ,  $\text{TiO}_2$ ,  $\text{CeO}_2$ ,  $\text{HfO}_2$ ,  $\text{MgO}$ ,  $\text{SiO}_2$ , (b) two cations of the general formula  $\text{ABO}_3$ , wherein A is Si, Al, Y or Lanthanides, B is Ba, Sr, Ca, Mg or Fe; with general formula  $\text{AlM}_2\text{O}_5$ , where M = Ti, Zr or Hf, or with general formula  $\text{Al}_2\text{NO}_4$ , where N = Mg, Ca, Sr, Ba, Zn, (c) three cations with the general formula  $\text{A}(\text{B}_{0.5}\text{B}'_{0.5})\text{O}_6$  or  $\text{A}_2(\text{BB}')\text{O}_6$ , where A is Ba, Sr, Ca or Mg, B is Zr, Hf, Sb or Sn, B' is Al, Y or Lanthanides, (d) four cations with general formula  $(\text{AA}')(\text{BB}')\text{O}_6$ , where A and A' are Ba, Sr, Ca or Mg, B is Zr, Hf, Sb or Sn, B' is Al, Y or Lanthanides.
3. A process as claimed in claim 1 wherein the complexing agent is selected from the group comprising of citric acid, EDTA and oxalic acid.
4. A process as claimed in claim 1 wherein the nitrate/ammonia content in the system is adjusted by addition of ammonium nitrate where the precursor is formed in an organic solvent.
5. A process as claimed in claim 1 wherein the nitrate/ammonia content in the system is adjusted by the addition of nitric acid and ammonia or ammonium nitrate where the precursor complex is formed in water.

6. A process as claimed in claim 1 wherein water insoluble metal salts are brought into solution by dissolving them in an organic solvent.

7. A process as claimed in claim 1 wherein the metal salts are selected from the group comprising of alkoxides, nitrates, chlorides, sulphates, oxychlorides or any other salts that are soluble in an organic solvent.

8. A process as claimed in claim 1 wherein the water insoluble oxides and carbonates of the desired metal are dissolved in suitable acids prior to use.

9. A process as claimed in claim 1 wherein the organic solvent is selected from the group comprising of alcohols, trichloroethylene, and any other solvent capable of dissolving the complexing agent and any one of the metal salts needed to form the desired oxide.

10. A process as claimed in claim 9 wherein the alcohol is selected from the group comprising of ethyl alcohol, methyl alcohol and isopropyl alcohol.

11. A process as claimed in claim 1 wherein the combustion is self-ignited and propagated when heated.

12. A process as claimed in claim 11 wherein the heating is done on a sand bath/hot plate.